

APPENDIX I

WESTERN
SOIL AND FOUNDATION ENGINEERING, INC.

SPECIFICATIONS FOR CONSTRUCTION OF CONTROLLED FILLS

General Description: The construction of controlled fills shall consist of adequate geotechnical investigations, and clearing, removal of existing structures and foundations, preparation of land to be filled, excavation of earth and rock from cut area, compaction and control of the fill, and all other work necessary to complete the grading of the filled area to conform with the lines, grades, and slopes as shown on the accepted plans.

Clearing And Preparation Of Areas To Be Filled:

- (1) All fill control projects shall have an investigation or a visual examination, depending upon the nature of the job, performed by a qualified soil engineer prior to grading.
- (2) All timber, trees, brush, vegetation, and other rubbish shall be removed, piled and burned, or otherwise disposed of to leave the prepared area with a finished appearance free from unsightly debris.
- (3) Any soft, swampy or otherwise unsuitable areas, shall be corrected by drainage or removal of compressible material, or both, to the depths indicated on the plans or as directed by the soil engineer.
- (4) The natural ground which is determined to be satisfactory for the support of the filled ground shall then be plowed or scarified to a depth of at least six inches (6") or deeper as specified by the soil engineer, and until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.
- (5) No fill shall be placed until the prepared native ground has been approved by the soil engineer.
- (6) Where fills are made on the hillsides with slopes greater than 5 (horizontal) to 1 (vertical), horizontal benches shall be cut into firm undisturbed natural ground to provide lateral and vertical stability. The initial bench at the toe of the fill shall be at least 10 feet in width on firm undisturbed natural ground at the elevation of the toe stake. The soil engineer shall determine the width and frequency of all succeeding benches which will vary with the soil conditions and the steepness of slope.
- (7) (After the natural ground has been prepared, it shall be brought to the proper moisture content and compacted to not less than 90% of maximum density, A.S.T.M. D1557-91.

- (8) Expansive soils may require special compaction specifications as directed in the report of geotechnical investigation by the soil engineer.
- (9) The cut portions of building pads may require excavation and recompaction for density compatibility with the fill as directed by the soil engineer.

Materials: The fill soils shall consist of select materials graded so that at least 40 percent of the material passes the No. 4 sieve. The material may be obtained from the excavation, a borrow pit, or by mixing soils from one or more sources. The material used shall be free from vegetable matter, and other deleterious substances, and shall not contain rocks or lumps greater than 6 inches in diameter. If excessive vegetation, rocks, or soils with unacceptable physical characteristics are encountered, these materials shall be disposed of in waste areas designated on the plans or as directed by the soil engineer. If soils are encountered during the grading operation which were not reported in the report of geotechnical investigation, further testing will be required to ascertain their engineering properties. Any special treatment recommended in the preliminary or subsequent soil reports not covered herein shall become an addendum to these specifications.

No material of perishable, spongy, or otherwise unstable nature shall be used in the fills.

Placing, Spreading And Compacting Fill Material:

- (1) The selected fill material shall be placed in layers which shall not exceed six inches (6") when compacted. Each layer shall be spread evenly and shall be thoroughly blade-mixed during the spreading to insure uniformity of material and moisture in each layer.
- (2) When the moisture content of the fill material is below that specified by the soil engineer, water shall be added until the moisture content is near optimum as determined by the soil engineer to assure thorough bonding during the compacting process.
- (3) When the moisture content of the fill material is above that specified by the soil engineer, the fill material shall be aerated by blading and scarifying, or other satisfactory methods until the moisture content is near optimum as determined by the soils engineer.
- (4) After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than the specified maximum density in accordance with A.S.T.M. D1557-91. Compaction shall be by means of tamping or sheepfoot rollers, multiple-wheel pneumatic-tired rollers, or other types of rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient passes to obtain the desired density. The entire area to be filled shall be compacted to the specified density.

- (5) Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall be continued until the slopes are stable and until there is no appreciable amount of loose soil on the slopes. Compacting of the slopes shall be accomplished by backrolling the slopes in increments of 3 to 5 feet in elevation gain or by other methods producing satisfactory results.
- (6) Field density tests shall be made by the soil engineer for approximately each foot in elevation gain after compaction, but not to exceed two feet in vertical height between tests. The location of the tests in plan shall be spaced to give the best possible coverage and shall be taken no farther than 100 feet apart. Tests shall be taken on corner and terrace lots for each two feet in elevation again. The soil engineer may take additional tests as considered necessary to check on the uniformity of compaction. Where sheepsfoot rollers are used, the tests shall be taken in the compacted material below the disturbed surface. No additional layers of fill shall be spread until the field density tests indicate that the specified density has been obtained.
- (7) The fill operation shall be continued in six inch (6") compacted layers, as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

Supervision: Supervision by the soil engineer shall be made during the filling and compacting operations so that he/she can certify that the fill was made in accordance with accepted specifications.

The specifications and soil testing of subgrade, subbase, and base materials for roads, or other public property shall be done in accordance with specifications of the governing agency.

Seasonal Limits: No fill material shall be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, grading shall not be resumed until field tests by the soil engineer indicate that the moisture content and density of the fill are as previously specified. In the event that, in the opinion of the engineer, soils unsatisfactory as foundation material are encountered, they shall not be incorporated in the grading, and disposition will be made at the engineer's discretion.

APPENDIX II

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REFERENCES CITED

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